

and exhaustive paper in the last volume of the *Memoirs* of the Royal Astronomical Society) to be 11'111 years. While if we ask the magnetic men the length of the cycle of their needle manifestations, they (as in Mr. Allan Broun's first paragraph on p. 183) declare it as confidently to be 10'5 years.

Wherefore I would request to be kindly informed if the maxima of the two cycles do approximately agree just now, where will they be, relatively to each other, after a dozen cycles hence? And the answer may or may not assist in clearing up certain apparent anomalies in the Edinburgh earth-thermometer observations.

PIAZZI SMYTH

15, Royal Terrace, Edinburgh, January 11

On the Insects of Chili and New Zealand

IN Mr. McLachlan's note "On Some Peculiar Points in the Insect Fauna of Chili" (*NATURE*, vol. xvii. p. 162), I see, with surprise, the remark that "the large islands of New Zealand furnish us with no indication whatever of forms parallel with those found in Chili," for it is well known that many Lepidoptera belonging to European genera do occur in New Zealand, although, perhaps, neither *Argynnis* or *Colias*. Amongst a small number of Lepidoptera from New Zealand which lately came into my hands, I notice species of the following European genera:—*Seia*, *Cloanthia*, *Nonagria*, *Heliothis*, *Hybernia*, *Larentia*, *Fidonia*, *Cidaria*, *Coremia*, *Camplogramma*, *Asthena*, *Acidalia*, *Scoparia*. Except in the case of *Seia tipuiforme*, it is not probable man has had any hand in the introduction of them. None, except the *Seia*, are identical with European species, although several approximate, and the causes which have led to the existence of *Agyrnis* and *Colias*, in Chili, are probably the same as those which have planted the insects I have named in New Zealand.

In Mr. Darwin's "Origin of Species," Chapter XII., we find a suggested Explanation of the Presence of the Forms of the Northern Temperate Zone in South America and New Zealand in the occurrence of alternate glacial epochs at the North and South Poles, and although the observations especially refer to plants, they are applicable to the insects which would, doubtless, accompany them in their supposed migrations. Perhaps it is not an entirely satisfactory explanation, and with his usual candour, Mr. Darwin admits that it does not meet all difficulties. In describing the wanderings of the plants, Mr. Darwin uses terms (figurative of course) which endow them with extraordinary if not voluntary powers of locomotion, as, indeed, they would seem to require in reality, for effecting such wonderful migrations, and as regards insects Mr. McLachlan goes further, and suggests that some of them "mistook the points of the compass and went southward."

Now the pertinacity with which the Lepidoptera adhere to particular plants and stations, and prefer death to change of either, is a much more noticeable character than their ability to emigrate, and seems to me a serious bar to the acceptance of a theory involving great changes of food and a double journey across the equator; possibly some of the polyphagous species might survive it, but even these, according to Mr. McLachlan, appear to have got a little muddled in their reckoning. Most of the insects I have named are eminently select in their diet, and how are we even to conceive of the wingless female of *Hybernia* performing the vast journey?

I do not know that we have evidence that change of climate induces migration of the Lepidoptera. There is a large colony of *Bryophila perla*, which has been stationed on an old wall here for the last twenty years, and although there are miles of similar lichen-covered walls in the neighbourhood, I have never seen a specimen fifty yards from head-quarters, and even under the threat of a new glacial epoch, I do not think it would consent to move on.

In saying there are no indications of similar forms on the northern portions of the Andes, I am not sure whether Mr. McLachlan refers to Lepidoptera or Trichoptera, so I will mention that I have received several species of *Colias* captured on the eastern Cordillera of New Granada. The genus probably ranges through the whole chain of the Andes.

Douglas, Isle of Man, January 2

EDWIN BIRCHALL

Macrosilia cluentius

IN *NATURE* (vol. viii. p. 223) I have spoken of a *Sphinx* which, with its proboscis of 0'25 metre length, would be capable

of obtaining nearly all the nectar of *Anagyris sesquipedale*. Lately my brother, Fritz Müller (Itajahy, Prov. St. Catharina, Brazil), sent me the wings of another specimen of the same species, and Dr. Staudinger, of Dresden, stated by comparison of these wings with the *Sphinxidae* of his collection that the name of the species is *Macrosilia cluentius*, Cramer.

Lippstadt, January 9

HERMANN MÜLLER

Meteor

I TAKE the liberty of forwarding the following particulars relative to a meteor which I saw on Sunday last at 4h. 24m. P.M., that is to say, about twenty minutes after sunset. As, however, the day had been very fine, there was not only full daylight in the west, but only a trace of twilight in the north-west direction, in which I saw the meteor. I may add that the sky was slightly overcast by watery clouds in that direction:—

Point from which seen, Salthill, near Kingstown; direction in which seen, north-west; elevation above horizon, 10° to 15°; length of luminous "tail," 5° to 6°; inclination from vertical, about (towards south) 10°; time, 4h. 24m. P.M.; colour of tail and of globe of explosion, light blue.

Judging from the elevation and from the fact of its being visible notwithstanding the strong twilight and the interposed clouds, I conclude that this meteor must have been remarkably brilliant and that it exploded over or beyond the West Coast of Ireland. It is for these reasons that I take the liberty of calling attention to it, as others may have seen it under more favourable conditions.

P. W. REILLY

Royal College of Science for Ireland,
Stephen's Green, Dublin, January 15

Philadelphia Diplomas

IN *NATURE*, vol. xvii. p. 183, there appears a note by Dr. C. M. Ingleby on the "Philadelphia Diplomas." Permit me to say that the only institutions in Philadelphia legally authorised to grant medical diplomas are the University of Pennsylvania, a school which has long ago celebrated its centenary, and the Jefferson Medical College. The so-called University of Philadelphia is a hybrid concern, the medical department of which is under the management of the Eclectic Medical School.

January 10

RICH'D. C. BRANDEIS

Great Waterfalls

I SHALL be much obliged if you, or any of your readers, can inform me in what book I can find accounts of any of the following great waterfalls:—The Tequendama Fall, near Sta. Fé de Bogota, South America; the Cauey Falls, near Seringapatam, India; the Alatau Falls, Alatau Mountains, Central Asia; the Guava, or Guayra Falls, on the Alto Parana, South Brazil; Falls of the Rio Grande, near Guadalajara, Mexico. These great falls, five of the most remarkable in the world, are shortly noticed in books of geography, but I have hitherto been unable to obtain any detailed particulars or description of them.

Eltham, January 7

ARTHUR G. GUILLEMARD

BIOLOGICAL NOTES

SELF-FERTILISATION OF PLANTS.—This subject, around which the genius of Mr. Charles Darwin has thrown a halo, seems likely to give rise to further controversy. The Rev. G. Henslow, in a communication laid before the first meeting this session of the Linnean Society, gave an exposition of the views he had arrived at; these in many respects being at variance with those promulgated by Mr. Darwin. The author acknowledged how indebted he stood towards the latter, whose vast storehouse of facts and close reasoning necessitated constant reference to his writings; but the author's own deductions therefrom, and additional researches, nevertheless, confirmed him in hesitating to accept some of Mr. Darwin's conclusions. According to Mr. Henslow, the chief facts and bearings of the self-fertilisation of plants may thus be summarised: 1. The majority of flowering plants are self-fertile. 2. Very few are known to be physiologically self-sterile. 3. Many are morphologically self-sterile. 4. Self-sterile plants become self-fertile by (a) withering of

the corolla, (b) its excision, (c) loss of colour, (d) closing, (e) not opening, (f) absence of insects, (g) reduction of temperature, (h) transportation. 5. Highly self-fertile forms may arise under cultivation. 6. Special adaptations occur for self-fertilisation. 7. Inconspicuous flowers are highly self-fertile. 8. Cleistogamous flowers are always self-fertilised. 9. Conservation of energy in reduction of pollen. 10. Relative fertility may equal or surpass that of crossed plants. 11. It does not decrease in successive generations. 12. It may increase. 13. Free from competition self-fertilised plants equal the intercrossed; (a) as seedlings, (b) planted in open ground. 14. They may gain no benefit from a cross from the same or a different stock. 15. They are as healthy as the intercrossed. 16. They may be much more productive than flowers dependent upon insects. 17. Naturalised abroad they gain great vigour; and (18) are the fittest to survive in the struggle for life.

PHYSIOLOGICAL ACTION OF NICOTIN.—About twenty years ago the Rev. Prof. Haughton called attention to the fact that there was an antagonism between the actions of nicotine and of strychnia. His experiments were on frogs. About ten years afterwards Dr. Wormley experimented in the same direction with cats; and some five years ago Dr. Reese performed a series of experiments with these drugs on dogs. Not satisfied with the results of any of these experimenters and recognising the great importance of the subject, Dr. Haynes has made a long series of experiments on dogs, cats, rabbits, and rats, and after some 143 experiments, has come to the following conclusions:—"The recorded cases of strychnia poisoning treated by tobacco are extremely unsatisfactory. If they prove anything it is merely that tobacco is a powerful emetic." "Haughton's experiments on this subject (really only two in number) were performed in such an unscientific manner as to be utterly valueless." "Strychnia and nicotine are in no degree antagonistic poisons." "Strychnia increases the convulsive action and does not diminish the motor paralysis of nicotine." "Nicotine (even in paralysing doses) increases the convulsive action of strychnia." "Both poisons cause death by paralysing the respiratory organs. They may affect respiration in different ways, but the result is the same." Animals may be killed by injecting together doses of the two drugs which, singly, are not fatal. (*Proceedings of the American Philosophical Society*, vol. xvi., No. 99.)

GLASSY SPONGES.—Drs. W. Marshall and A. B. Meyer have published a memoir, as one of a series of communications to the Zoological Museum at Dresden, "On some new or little-known sponges belonging to the Hexactinellidæ found in the Philippines." It seems but the other day since one could have numbered on the fingers of one hand all the known species of this family, so well known to many by that beautiful typical form, the Venus's flower-basket (*Euplectella*), and now the number of described species is very large. In 1872 one of the authors (Dr. Meyer) was staying at Cebu one of the Philippine group, where *Euplectella aspergillum* is a regular article of trade, quoted at so much a dozen, and where it is not surprising that he should discover a number of other lovely forms in this memoir described and figured. Among the more interesting forms are the following:—*Hyalocaulos simplex*, *Myriusia zittelii*, and two species of *Aulodictyon*, all of these found living attached to the basal portion of *Euplectella*. *Semperella schultzei* is figured of a natural size from a specimen twenty-one inches in length, and figures of the spicules of the various new species are also given.

A MALE NURSE.—The interest of the reproduction of Batrachians is by no means yet exhausted. A Spanish naturalist, Jimenez de la Espada, has recently discovered additional facts respecting *Rhinoderma darwini* (of Chili), which was first made known by Mr. Darwin.

He finds that the supposed viviparous birth of the young from the female is a very different phenomenon. It is the males which are the nurses, and they have an extraordinary brood-sac, developed as a pouch from the throat, and extending over a great portion of the ventral surface of the animal. In this cavity a number of living tadpoles were found, in number of individuals, and the length of the tadpoles was about 14 mm. How these are first developed and nourished is not yet known. Dr. J. W. Spengel translates a portion of the Spanish paper in the current number of the *Zeitschrift für wissenschaftliche Zoologie*, vol. xxix. part 4.

STRUCTURE OF CYCADEÆ.—E. Warming, of Copenhagen, publishes (in Danish with French abstract) some fresh researches on this subject ("Recherches et Remarques sur les Cycadées," Copenhagen, 1877). He confirms in general the results previously arrived at by A. Braun and others, from the structure of the ovule and seed, the pro-embryonic characters, the mode of formation of the pollen and pollen-plant, and of the growth of the stem and roots, &c., that the Cycadæ are very nearly allied to the Conifera; and in particular he places them near to the Ginkgo (*Salisburia adiantifolia*). Among Cryptogams he considers them to come nearest to Marattiaceæ and Ophioglossaceæ among Filicineæ. He proceeds then to discuss the homology of the ovule of Phanerogams, on which he thinks the structure of that of the Cycads—intermediate between Vascular Cryptogams and Angiosperms—throws much light. The phanerogamic ovule he considers to be composed of two parts, of different morphological origin, viz., a nucleus which is homologous with the macrosperangium; and a lobe of the leaf which bears the nucleus, consisting partly of the funiculus and partly of the integuments. In Angiosperms the nucleus rests on the surface of the leaf; in Gymnosperms it is partly imbedded in it. No part of the ovule is of axial origin (*caulome*).

THE BRAIN OF A FOSSIL MAMMAL.—Prof. Cope has been able to take a cast of the cranial cavity of a species of the Tapirid genus *Coryphodon*, from the Wahsatch beds of New Mexico. This has revealed remarkable primitive characters: (1) the small size of the cerebellum; (2) the large size of the region of the corpora quadrigemina; (3) the cerebral hemispheres were small, and (4) the olfactory lobes were very large. The medulla oblongata is wider than the cerebral hemispheres. In profile the brain closely resembles that of a lizard. These characters are so extraordinary that Prof. Cope considers them sufficient to mark a primary division of mammalia, which he, following Owen, calls *Protencephala*. Prof. Cope describes and gives figures of a cast, the skull cavity, in the *Proceedings of the American Philosophical Society*, vol. xvi., No. 99.

INSECTIVOROUS PLANTS¹

SINCE the appearance of Mr. Darwin's work on "Insectivorous Plants" the want of direct proof that the plants profit by their carnivorous habits has been somewhat widely felt. Thus we find expressions to this effect by MM. Cassimir de Candolle, Cramer, Duchartre, Duval-Jouve, Faivre, Göppert, E. Morren, Munk, Naudin, W. Pfeffer, Schenk, &c., &c.

The assent which many naturalists have given to Mr. Darwin's explanation of the meaning of the structure and physiological properties of carnivorous plants rests on a sound basis, namely, the impossibility of believing that highly specialised organs are unimportant to their possessor, and the difficulty of giving any rational explanation except the one proposed in "Insectivorous Plants." Mr. Darwin himself felt the desirableness of direct evidence on this head, and the experiments intended to

¹ From a paper "On the Nutrition of *Drosera rotundifolia*," by Francis Darwin, M.B., read before the Linnean Society, January 17, 1878.